

A NEW GENUS OF NYMPHALIDÆ AND ITS AFFINITIES (LEPIDOPTERA, RHOPALOCERA)

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In the course of a study of the West Indian butterfly fauna, the relationships of the species commonly known as *Mestra* (or *Cystineura*) *teleboas* came into question. Accordingly, an examination of the morphology of this and allied forms was undertaken, in order to determine these relationships as far as possible. It was concluded that *teleboas* is generically distinct from *hyper-mestra* Hübner, the genotype of *Mestra*, and cannot legitimately be referred to any other described genus. A brief synopsis of the genera studied is therefore presented, together with a description of the new genus.

The genera under consideration belong to a small group of Nymphalinae, distributed in the Neotropical, Ethiopian, and Oriental regions, and characterized in the adult by the strong inflation of the basal part of subcosta of the fore wing, without a corresponding inflation of any other vein. The adults appear to be similar in habits, in whatever region they may be found; the known larvæ are also similar, and all feed on Euphorbiaceæ, mostly on species of *Tragia*. The homogeneity of the group was recognized by Doubleday and Westwood (1851), who, however, included with it certain aberrant Satyrine genera under the family name Eurytelidæ. Schatz (1887) did not treat the group as a unit, but included all its genera in the Nymphalinae, and it remained for Aurivillius (1898) to erect the tribe Eurytelidi for the African genera. Seitz (1921) pointed out the similarities of the American genera to those of the Old World, and united them under the tribal name Ergolini.

The following ten genera, which constitute the tribe Eurytelini or Ergolini as understood by Seitz, appear, with the probable exception of *Biblis*, to be closely related. They are certainly also nearly allied to the other swollen-veined Nymphalinae (*Eunica*, etc.), many genera among which feed on Euphorbiaceæ, while the group as a whole shows the same tendency toward specialization

of the eighth abdominal sternite of the male that is so characteristic of the present tribe. There is something to be said for the gathering of all the swollen-veined forms and their allies, including even the highly specialized *Hamadryas* (*Ageronia*), in a single tribe; whether this would be the most convenient arrangement, the writer is not prepared to say: it would have the disadvantage, for instance, of obscuring the fact that the *Ergolis* complex is the only part of the group which is generally distributed, all the remaining genera, with the one exception of *Crenis*, being limited to tropical America.

The internal relationships of the Eurytelini are not entirely clear, owing to the fact that the individual genera diverge rather strikingly in structure and pattern within the limits defined by the characters of the group. Several of the more striking characters, useful in generic diagnosis, appear to be distributed haphazardly, without evident regard to true relationship. Nonetheless, certain affinities can be made out. The three genera *Ergolis*, *Laringa*, and *Eurytela* are closely allied, agreeing in the angular wing form and in pattern (except in certain species of *Ergolis*, mimetic of *Euplœa*), and also in some characters of the male genitalia, notably in the ædæagus, which is heavy and dorsiventrally flattened, or even trough-shaped, and in the valve, which is emarginate ventrally and closely articulated with the lateral process of the deeply bilobed juxta, so as to form a biramous composite structure. *Byblia* is evidently fairly close to these genera, having the same heavy, flattened ædæagus, but appears to be more primitive in having rounded wings, and in having the valve less intimately associated with the juxta. *Neptidopsis*, *Mesoxantha*, and the new genus agree in having the valve reduced ventrally but not closely associated with the juxta; otherwise the three genera are not particularly close in structure, although *Neptidopsis* and the new genus agree in pattern. This black and white pattern is suggestive of the Limenitini, and may be the primitive pattern of the group. The stout ædæagus and heavily sclerotized genitalia of *Neptidopsis* are vaguely suggestive of *Ergolis* and its associated genera, but *Neptidopsis* shows none of the definite specializations which characterize them, so the resemblance may be illusory. Like *Mesoxantha*, *Mestra* and *Vila* have

a long slender ædæagus, but differ from all the other genera in having the valve normally developed. *Biblis* is unique in having the male palpi strikingly modified, and its male genitalia differ markedly from those of the other genera here considered; in the writer's opinion it cannot be included in the Eurytelini, and must occupy a somewhat isolated position in the general swollen-veined group.

Genus 1. *Ergolis* Boisduval

Ergolis Boisduval, 1835, pl. 4, f.4. Genotype and sole original species: *Papilio ariadne* Johannson (1763).

Ariadne Horsfield, 1829, pl. 6, f.2. Genotype and sole original species: *Papilio ariadne* Johannson (1763). Homonym of *Ariadne* Savigny (1825).

Palpi long and porrect; eyes naked. Fore wing with cell closed; lower discocellular sinuate (in *merione* and *pupillata* almost straight), terminating posteriorly at the fork of M_3 and Cu_1 . Hind wing with cell closed; basal part of M_2 (middle discocellular) strongly curved; lower discocellular concave outwards, terminating at the fork of M_3 and Cu_1 . Male with prominent sex scaling on the posterior half of the fore wing beneath and on the anterior part of the hind wing above, in some species also on the upper side of the fore wing. In *E. obscura*, M_3 and Cu_1 of both fore and hind wings are stalked for a short distance.

Male genitalia showing considerable specific variation; sometimes highly specialized. Eighth tergite with a weak anterolateral process on each side. Eighth sternite variable, always bilobed and spined posteriorly; in the genotype the lobes are inconspicuous and rounded, in *pupillata* they are somewhat more conspicuous and upturned, in *enotrea* they form long slender processes, which bear a comb-like row of spines and a stout terminal spine, and extend dorsad beyond the costa of the valve. Saccus slender, straight or curved, length varying with the species. Uncus rather broad, pointed, not clearly distinct from tegumen. Valve rather slender, somewhat emarginate ventrally, rounded or hooked at the tip. Juxta deeply divided, lobes closely associated with ventral margin of valves. Aedæagus variable; in the genotype long, rather slender, and slightly decurved, with

a blunt tip, in other species much stouter, upcurved, and dorsiventrally flattened or even trough-shaped.

A moderately large genus, distributed throughout the Oriental and Ethiopian regions. The great variation in structure, even among the few species examined, is striking, and a morphological study of the full range of species should be most fruitful. It is quite possible that the results of such a study would necessitate the splitting of the genus, while they would certainly reveal interesting interrelationships among the species.

Species examined: *ariadne* Joh., *enotrea* Cr., *isæus pupillata* Fruhst., *merione* Cr., *actisanes* Hew., *obscura* Fldr. (external characters); *ariadne* Joh., *enotrea* Cr., *isæus pupillata* Fruhst. (male genitalia).

Genus 2. *Laringa* Moore

Laringa Moore, 1901: 24. Genotype, by original designation: *Eurytela horsfieldii* Boisduval (1833).

Palpi densely scaled, moderately long, porrect; eyes naked. Cell of fore wing closed; lower discocellular gently concave externally, ending at or slightly beyond the fork of M_3 and Cu_1 . Hind wing with cell closed; M_2 sharply angled shortly beyond its origin from M_1 , then rather gently curved; lower discocellular slightly concave outwards, terminating at fork of M_3 and Cu_1 . Male differing from female in colour, in *horsfieldii* moderately, in *castelnavi* strikingly. Male without conspicuous sex scaling.

Male genitalia of the *Ergolis* type, but less specialized. Eighth sternite elongate, somewhat emarginate laterally, very moderately bifid posteriorly, without spines. Saccus long and slender, slightly upcurved anteriorly. Uncus simple, not sharply distinct from tegumen. Subscaphium moderately well developed, connected by lateral arms with the tegumen. Valve narrow, bearing ventrally at the base a lobe belonging to the juxta. Aedæagus heavy, depressed, upturned posteriorly.

This genus is closely related to *Ergolis*, with which it might perhaps be united, but in certain respects it appears to mark a transition to *Eurytela*. It is limited to tropical Asia.

Species examined: *horsfieldii* Bsd. (external characters and male genitalia); *castelnavi niha* Fruhst. (external characters).

Genus 3. *Eurytela* Boisduval

Eurytela Boisduval, 1833: 54. Genotype: *Papilio dryope* Cramer.

Doubleday (1844) selected a genotype by elimination; this action was accepted as valid by Scudder (1875), who formally designated *dryope* as the genotype.

Palpi very long, third joint porrect; eyes densely hairy. Fore wing with cell weakly closed; lower discocellular very gently concave, terminating beyond fork of M_3 and Cu_1 . Hind wing with cell closed; M_2 arising just beyond fork of RS and M_1 ; lower discocellular straight, arising well beyond fork of M_1 and M_2 , terminating at fork of M_3 and Cu_1 ; fork M_{1-2} nearer base than fork Cu_{1-2} .

Male genitalia of the *Ergolis* type; eighth sternite moderately elongate, trilobed posteriorly, but with posterior median portion, including median lobè, very weakly sclerotized; lateral lobes spined. Uncus simple, clearly distinct from tegumen. Subscaphium well developed, connected with tegumen by a pair of lateral arms. Saccus moderately long, tapering anteriorly. Valve narrow, bearing ventrally at the base a lobe belonging to the juxta. Aedæagus stout, flattened, straight.

The only genus of the tribe with hairy eyes. Confined to the Ethiopian region, where three species are known, *alinda* Mab. certainly being distinct.

Species examined: *hiarbas* Dru. (external characters and male genitalia); *dryope* Cr., *alinda* Mab. (external characters).

Genus 4. *Byblia* Hübner

Byblia Hübner, 1819: 28. Genotype and sole original species: *Papilio ilithyia* Drury (1773).

Hypanis Boisduval, 1833: 55. Genotype: *Papilio ilithyia* Drury (1773), designated by Scudder (1875), who believed the two original species to be identical.

Palpi finely scaled, third joint very long and porrect; eyes naked. Cell of fore wing weakly closed; lower discocellular concave outwards, ending just beyond fork of M_3 and Cu_1 . Hind wing with cell closed; M_2 strongly curved at base; fork RS- M_1 slightly nearer base than fork Cu_{1-2} ; lower discocellular concave outwards, ending at fork of M_3 and Cu_1 . As pointed out by

Aurivillius, in occasional specimens the hind wings have the cell open.

Male genitalia: eighth tergite with an antero-lateral process; eighth sternite long and heavy, somewhat upturned posteriorly; posterolateral angles somewhat produced, bearing three or four somewhat fusiform spines. Saccus long, slender, and curved. Uncus very slender, pointed, and decurved, clearly distinct from the tegumen; the latter bears a small posteriorly directed process on either side of the base of the uncus, representing the subscaphium, which is otherwise totally absent. Valve posteroventrally emarginate. Juxta well developed, articulating with the lower margin of the valve. Aedæagus heavy, depressed, upturned posteriorly.

A small genus, distributed throughout the tropics of the Old World.

Species examined: *acheloia* Cr. (external characters and male genitalia); *ilithyia* Dru. (external characters).

Genus 5. *Neptidopsis* Aurivillius

Neptidopsis Aurivillius, 1898: 155. Genotype: *Papilio ophione* Cramer (1779), new designation.

Palpi long, finely scaled, porrect; eyes naked. Fore wing with cell closed; lower discocellular gently concave externally, ending at fork of M_3 and Cu_1 . Hind wing with cell open; fork $RS-M_1$ about opposite to fork Cu_{1-2} , both very close to base; M_2 strongly curved at base.

Male genitalia; eighth sternite long and slender, somewhat bilobed posteriorly, each lobe bearing a single fusiform spine. Eighth tergite with a strong antero-lateral process. Saccus long, slender, and straight. Uncus pointed, not clearly distinct from tegumen. Subscaphium well developed, connected by lateral arms with the tegumen. Valve narrow. Aedæagus long, heavy, cylindrical, straight.

Distribution Ethiopian. Of the two species included by Aurivillius, *ophione* is here selected as the type.

Species examined: *ophione* Cr. (external characters and male genitalia); *fulgurata* Bsd. (external characters).

Genus 6. *Mesoxantha* Aurivillius

Mesoxantha Aurivillius, 1898: 157. Genotype and sole original species: *Papilio ethosea* Drury (1782).

Palpi rather slender, porrect, with bushy scaling; eyes naked. Fore wing with discocellular strongly concave externally, ending slightly beyond fork of M_3 and Cu_1 . Hind wing with cell closed; middle discocellular straight, arising from fork $RS-M_1$, longer than lower discocellular, the latter character being unique in the tribe; lower discocellular ending about midway between forks Cu_{1-2} and M_3-Cu_1 .

Male genitalia: eighth sternite slightly elongate, weakly bilobed posteriorly, unspined. Saccus long, slender, and straight. Uncus simple, distinct from tegumen. Subscaphium moderately well developed, connected by lateral arms with the tegumen. Valves somewhat emarginate postero-ventrally. Aedæagus long, slender except at base, pointed, bent upwards somewhat before the middle.

The genus is confined to tropical Africa. The contrast between the primitive genitalia, which do not differ greatly from those of *Eunica*, and the specialized wing venation is striking. The venation has perhaps become modified in connection with the development of *Acræine* mimicry.

Species examined: *ethosea* Dru. (external characters and male genitalia).

Genus 7. *Archimestra* new genus

Genotype: *Argynnis teleboas* Ménétriés (1832)

Palpi long and porrect; eyes naked. Fore wing with cell closed; R_2 and R_3 arising together before end of cell; lower discocellular strongly concave outwards, ending at fork of M_3 and Cu_1 . Hind wing with cell closed; M_2 strongly curved at base, arising slightly beyond fork $RS-M_1$; latter farther from base of wing than fork Cu_{1-2} , but both fairly close; lower discocellular concave outwards ending between forks Cu_{1-2} and M_3-Cu_1 .

Male genitalia weakly sclerotized, with the parts somewhat reduced; eighth sternite not elongate, faintly bilobed posteriorly, without spines, though with a rather stout apical seta on each lobe; eighth tergite with a weak antero-lateral process. Saccus of moderate length, slender and slightly sinuate, pointed anteriorly. Uncus simple, clearly distinct from tegumen. Subscaphium absent, although the lateral arms articulating with the tegumen are weakly represented. Valve narrow, ventral part reduced.

Juxta weak and bifid. Aedæagus short, weakly sclerotized, moderately thick, upturned at about the middle.

The single species referred to this genus has been placed by all recent authors in *Mestra*, usually under the synonymous name *Cystineura*. The anomalous nature of the species has, however, frequently been recognized, and Seitz (1921) suggested that it might well be referred to *Neptidopsis*, in view of the similarity in wing pattern and length of palpi, but did not go so far as to make this revision himself. In point of fact, the detailed correspondence in pattern between the two genera is not too good, and, as already pointed out, the genitalia and wing venation are not similar. From *Mestra*, the new genus is easily distinguished by the closed cell of the hind wing, the sharply curved base of M_2 in the same wing, the absence of the subscaphium, and, superficially, by the strongly contrasting wing pattern of black and white. The absence of the subscaphium and the generally weak development of the male genitalia are probably secondary; the other characters of the genus may well be primitive. There is no clear indication of an immediate relationship with either *Mestra* or *Neptidopsis*.

Archimestra has a relict distribution, being confined to Hispaniola, where it is locally common. It no doubt represents an archaic type—a conjecture which has suggested the name.

Species examined: *teleboas* Mén. (external characters and male genitalia).

Genus 8. *Mestra* Hübner

Mestra Hübner, 1825, vol. 2, pl. 45. Genotype and sole original species: *Mestra hypermestra* Hübner (1825).

Cystineura Boisduval, 1836, pl. 9. Genotype and sole original species: *Papilio hersilia* Fabricius (1777).

Palpi moderately long, porrect; eyes naked. Fore wing with cell closed; R_2 and R_3 arising together at approximately the end of the cell; lower discocellular bent rather sharply near its posterior extremity. Hind wing with cell open; fork $RS-M_1$ somewhat farther from base than fork Cu_{1-2} ; M_2 rather gently curved at base.

Male genitalia: eighth sternite long, narrow, bilobed posteriorly; eighth tergite with a weak, downwardly directed antero-

lateral process. Saccus long, slender, and straight. Uncus simple, not clearly distinct from tegumen. Subscaphium moderately well developed, connected by lateral arms with the tegumen. Valve of normal width, bilobed at tip. Juxta weak, entire. Aedæagus pointed, slender except at base.

A Neotropical genus, with a small number of closely similar species, whose precise limits are not yet fully understood.

Species examined: *hypermestra* Hbn., *amymone* Men., *dorcas* F. (external characters and male genitalia).

Genus 9. *Vila* Kirby

Vila Kirby, 1871: 217. Genotype: *Oolina azeca* Doubleday (1848), automatically, as this name was proposed to replace *Oolina* Doubleday, of which *azeca* is the type.

Oolina Doubleday, 1848, pl. 31. Genotype and sole original species: *Oolina azeca* Doubleday (1848). Homonym of *Oolina* Robineau-Desvoidy (1830).

Palpi moderately long, porrect, with third joint rather short; eyes naked. Fore wing with cell closed; lower discocellular straight, ending between forks M_3-Cu_1 and Cu_{1-2} . Hind wing with cell closed; fork $RS-M_1$ somewhat farther from base than fork Cu_{1-2} ; M_2 rather strongly bent at base; lower discocellular strongly concave outwards, ending basad of fork M_3-Cu_1 .

The above description was made from *V. cacilia*; *V. emilia* agrees with it; *V. cacica* differs in having the cell of the hind wing open and that of the fore wing very weakly closed, while *V. azeca*, the genotype, has the cell open in both wings. These species are otherwise very similar in structure, and the differences mentioned do not appear to be of more than specific value.

Male genitalia (*V. azeca*): abdomen with very wide membranous pleural region; behind tergites 4 and 5 are conspicuous invaginated and presumably eversible mid-dorsal pockets, containing long, black scales. Eighth tergite with a long anterolateral process. Eighth sternite very long, extending anteriorly into segment 6; at the anterior extremity it is slender and furcate, posteriorly it is prolonged into two long, upwardly directed processes, bearing a comb-like row of long spines on the posterior margin. Saccus slender, of moderate length, bent upwards an-

teriorly. Tegumen broad and heavy, with a slender lateral process articulating with the valve. Uncus stout, spatulate, not clearly distinct from tegumen. Subscaphium prominent, lateral arms connecting with tegumen rather short. Valve slender, hairy, simple in outline, rather deeply emarginate basally between dorsal and ventral articulations. Juxta bilobed. Aedæagus fairly thick, upturned before middle, pointed distally.

V. cacilia differs in having a third pouch of scales behind the sixth abdominal tergite, in having the eighth sternite only moderately expanded and bilobed posteriorly, the lobes being thickly set internally with short spines, in having the uncus slender and pointed, in the valve being provided with a hand-shaped expansion distally, and not being emarginate basally between the articulations, in the saccus being long, slender, and straight, and in the form of the juxta. Other species would no doubt show correspondingly great differences.

The genus is Neotropical in distribution.

The data concerning the original publication of *Olina* Doubleday are taken from Scudder (1875); the plate cited bears no date. Whether or not it antedated the corresponding text is immaterial from the present standpoint, as *azeca* remains the genotype in the latter event, on the basis of Scudder's designation. Those interested in this question may consult Brown (1941) and Hemming (1941).

Species examined: *azeca* Dbl., *cacilia* Fldr. (external characters and male genitalia); *emilia* Cr., *cacica* Stgr. (external characters).

Genus 10. *Biblis* Fabricius

Biblis Fabricius, 1807: xi, no. 14. Genotype, by absolute tautonymy: *Papilio biblis* Fabricius (1775).

Zonaga Billberg, 1820: 7. Genotype and sole original species: *Papilio biblis* Fabricius (1775).

Palpi long, those of female very long; in the male the third joint is considerably modified, being short, compressed, and rounded at the tip; in the female this joint is of normal form, moderately long, and pointed at the tip. Eyes naked. Fore wing with cell closed; lower discocellular very gently convex out-

wards, ending distinctly basad of fork M_3-Cu_1 . Hind wing with cell open; M_2 strongly curved at base, arising well beyond fork $RS-M_1$, which is opposite fork Cu_{1-2} . Male with a conspicuous oval patch of modified scales on the under side of the fore wings, just anterior to A_2 .

Male genitalia highly modified; eighth tergite without an antero-lateral process; eighth sternite heavily sclerotized, greatly expanded, especially at front, with anterior and posterior angles heavily spined; saccus moderately long and stout; uncus deeply bifid, distinct from tegumen; subscaphium long and broad, boat shaped, with short and very broad lateral arms, which narrow rapidly toward the tegumen; valve of normal width, pointed at tip; juxta strongly bilobed; ædæagus long, slender, tubular and straight, pointed at tip.

The genitalia differ in almost every important character from those of the Ergolini, and there is little probability of a direct relationship. The single species is Neotropical.

As pointed out by Scudder (1875), D'Almeida (1942), and Comstock (1943), the type of *Didonis* is a Satyrine, and the name cannot legitimately be used for the present genus.

Species examined: *hyperia* Cr. (= *biblis* F.).

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